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# PATENT SPECIFICATION

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308.254

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## COMPLETE SPECIFICATION.

### Process for the Treatment of Liquids with Gases.

We, KUPFERHÜTTE ERTTEL, BIEBER & Co., of 9, Mönckebergstrasse, Hamburg, Germany, a limited liability company, organised and existing under the laws of Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 In the treatment of liquids with gases by blowing the gas into the liquid the amount of power required is often very high, particularly when dealing with impure gases or gases which do not completely enter into reaction with the liquid, as, for instance, in the case of numerous oxidising processes which are carried out by blowing in air.

15 The present invention has for its object to provide an improved method of and means for intimately mixing gases with liquids by withdrawing liquid from a body thereof contained in a receptacle with the gas above its surface, positively circulating the withdrawn liquid and returning it through the superjacent gas layer to the surface of said body of liquid.

20 According to the invention, the circulated liquid is projected continuously, through a rigidly mounted nozzle, in a strong compact jet, directly on to the liquid surface, in such a manner that the jet penetrates into the liquid, carrying with it a quantity of the said gas, which is thereby intimately mixed with said liquid.

25 The effect is augmented if the circulation of the liquid be produced by the well known Mammut pump the latter being driven by the gas to be absorbed.

30 For instance, the precipitation of solutions of ferrous oxide by milk of lime with the simultaneous blowing in of air, in order to convert the iron to the higher state of oxidation, takes place very sluggishly and requires such a considerable amount of power that the conversion of the iron into the higher state of oxidation is as a rule effected by chemicals.

35 By the method herein described it is possible to carry out the above said process with an expenditure of power, the cost of which amounts to only a trifling

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fraction of that of the chemicals which would otherwise be required.

55 A manner of carrying out the process is illustrated by way of example in the accompanying drawing. The liquid F to be treated is pumped by means of the pump C through the pipes B and D from the lower part of the receptacle A and returns thereto in a strong compact jet which is projected from the rigidly mounted nozzle G, through the superjacent layer of gas E directly on to the surface of the liquid. The jet, so directed continuously on to the liquid penetrates beneath the surface thereof, carrying a quantity of the gas with it, so that the gas is energetically intermixed with the liquid below the surface thereof. We are aware that in specification No. 1996 of 1890, which relates to the rousing of beer, an apparatus is disclosed wherein beer, drawn by a hand pump from the lower part of a vat, is delivered by said pump, through a flexible indiarubber pipe, to a nozzle from which a stream of liquor can be directed on to any part of the surface, or head, of the beer contained in the vat. We make no claim to such an arrangement: neither is our invention concerned with apparatus of the kind in which liquid, pumped from a body of liquid is sprayed or jetted on to the surface of the liquid body through a tubular chamber into which gas is admitted only in the vicinity of the spraying or jetting device and which extends to the surface of the liquid.

60 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

65 1. A method of treating liquids with gases, wherein liquid withdrawn from a body of liquid contained in a receptacle with the gas above its surface is positively circulated and returned through the superjacent gas layer to the surface of said body of liquid, characterised by the fact that the circulated liquid is projected continuously, through a rigidly mounted nozzle, in a strong compact jet directly on to the liquid surface in such a

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manner that the jet penetrates into the liquid, carrying with it a quantity of the said gas which is thereby intimately mixed with said liquid.

5 2. A method according to claim 1, characterised by the fact that circulation of the liquid is produced by a Mammut pump, which is driven by the gas to be absorbed.

10 3. Means for carrying out the process according to claim 1, characterised by the fact that the liquid (F) to be treated, coming from the lower part of a recep-

tacle (A) is circulated by means of a pump (C) through pipes (B and D) and pro- 15  
jected from a rigidly mounted nozzle (G) in a strong compact jet, through a layer of gas (E) to be absorbed, on to the surface of the liquid in the receptacle (A).

Dated this 4th day of March, 1928.

For the Applicants,

LLOYD WISE & Co.,

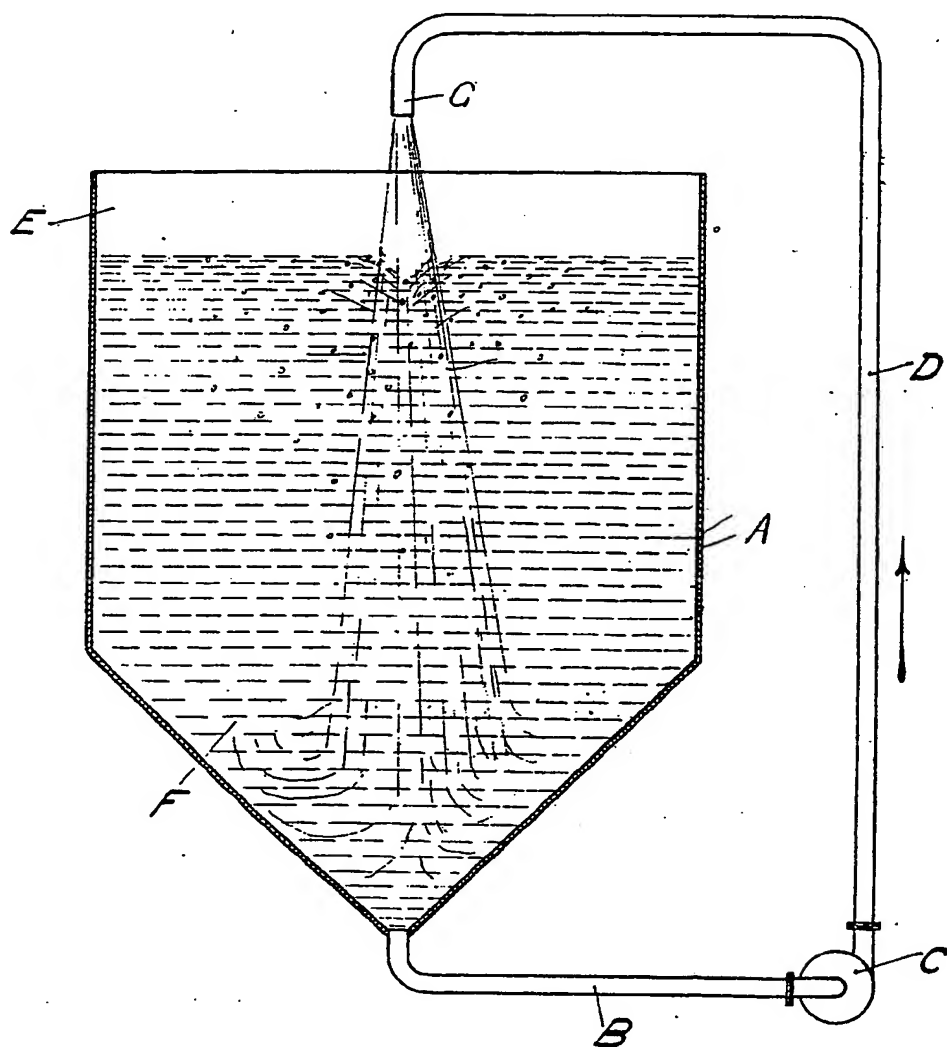
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